

I have, besides this, made Inquiry of various Persons, and cannot meet with one, who did see any Lightning, or who heard others say that they had seen it.

P. S. I am credibly informed, that a Gentleman's Servant at *Wandsworth* was watering his Master's Horse by the River-Side, at the time when the Earthquake happened, who found the Water so much agitated on a sudden, that the Horse started back, and would not drink.

XXIV.

The Rev. W. Stukely M. D. & F. R. S. to the President, on the Causes of Earthquakes.*

Read March 22. 1749. **W**HEN so great and unusual a

Phænomenon as an *Earthquake*, and *that* repeated, happens among us, it will naturally excite a serious Reflection in every one that is capable of thinking; and we cannot help considering it in a philosophical as well as religious View. Any Mind will take the Alarm, when we perceive a Motion that affects the Earth, that bears the whole City of *London*, and some Miles round; and at the same time, whilst it gives us so sensible a Shake, so gently sets us down again, without Damage to any Buildings, and without a Lite lost.

In the Works of Nature and Providence there are no Degrees of *Great* and *Little*: Comparisons are incompatible; nevertheless we ourselves are

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* This Paper is published separately by the Author, in a Pamphlet, at *London*, 1750. in 8vo.

more affected with what seems great, in our own Apprehensions; but an OMNIPOTENT POWER admits of no Distinctions; and whilst prodigious Effects are produc'd from Causes imperceptible, it rightly claims our serious Attention, as well as Wonder; nor need we lose Sight of the theological Purpose of these amazing Alarms, whilst we endeavour to find out the Philosophy of them.

Permit me, then, to throw in my Thoughts on the Cause of Earthquakes. I did not enter into the common Notion of Struggles between subterraneous Winds, or Fires, Vapours, or Waters, that heav'd up the Ground, like animal Convulsions; but I always thought it was an electrical Shock, exactly of the same Nature as those, now become very familiar, in electrical Experiments.

When we reflect on the unusual Winter now past, beyond what occurs to any one's Memory, that it has been dry and warm to an extraordinary Degree, the Wind generally South and South-West, and *that* without Rain, we may, with much Reason imagine, that the Earth has been in a State of Electricity, ready for that particular Vibration wherein Electricity consists.

And that it has been so, we may further conclude from the extraordinary Forwardness of Vegetation, from the Frequency of the Northern Lights, and especially of that called *Aurora australis*, which are with us in frequent, and twice repeated, just before the Earthquakes (being of such Colours as we had never seen before), and removed Southward, quite contrary to those common with us.

Add

Add to this, that some Foreigners among us, from *Italy*, and those Parts, where Earthquakes are frequent, observing these Lights, and the particular Temper of the Air, did actually foresee the Event of an Earthquake. All these Matters concur, in shewing, that the Earth was in a State of Electricity, beyond what has ever been in our Memory.

Admitting this, there is nothing wanting, to produce the wonderful Effect of an Earthquake, but the Touch of any non-electric Body; and that must necessarily be had *ab extra*, from the Region of the Air, or Atmosphere.

We had lately a very pretty Discourse read here, from Mr. *Franklyn* of *Philadelphia* *, concerning Thundergusts, Lights, and like Meteors. He well solves them by the Touch of Clouds, rais'd from the Sea (which are Non-electrics), and of Clouds rais'd from Exhalations of the Land (which are electrify'd): That little Snap, which we hear, in our electrical Experiments, when produc'd by a thousand Miles Compas's of Clouds, and *that* re-echoed from Cloud to Cloud, the Extent of the Firmament, makes that Thunder, which affrightens us.

From the same Principle I infer, that, if a non-electric Cloud discharges its Contents, upon any Part of the Earth, when in a high-electrify'd State, an Earthquake must necessarily ensue. As a Shock of the electric Tube in the human Body, so the Shock of many Miles Compass of solid Earth, must needs be an Earthquake; and that Snap, from the Contact, be the horrible uncouth Noise thereof.

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* Read Nov. 16, 1749. publish'd with other Tracts on Electricity, by Mr. Peter Collinson F. R. S. London 1750. 8vo.

I have been informed, by those who were up, and abroad, the preceding Night, and early in the Morning, that Coruscations in the Air were extremely frequent (which confirms us in the Notion of the Earth's being then in an electrify'd State); and that, a little before the Earthquake, a large and black Cloud suddenly cover'd the Hemisphere; which probably occasion'd the Shock, by Discharge of a Shower.

It may be said, That, if this were the Case, Earthquakes would happen much oftener than we find them. It may be answer'd, That they probably do, much oftener than observ'd: But *slight* ones; because of the Earth's being *slightly* electrified. And such a Winter as this has not been known before; to which we attribute the present Earthquake.

The Reason is obvious, why Earthquakes are not so frequent with us, and the Northern Regions in general, as in *Italy*, and more Southern Climes; and a due Consideration of it confirms our Reasoning. All Electricity requires great *Dryness* and *Warmth*; and I doubt not but Earthquakes, of a small Degree, have and do frequently happen. And many People now recollect, that they have been shaken in their Beds; tho' they took no notice of it then, having had no Experience of an Earthquake.

All that we have laid upon the Subject receives great Strength from *this* Particular, That Water strengthens and conveys the Force of Electricity. From whence we may account for that Observation, that the most dreadful Effects of Earthquakes are always felt in maritime Towns; as *Port-Royal* in

in *Jamaica*, *Lima* in *Peru*, *Messina* in *Sicily*, &c. And *here*, we find plainly, that the Shock went along the River, both upwards and downwards, farther than by Land; like the Bottle of Water held in the Hand, in electrical Experiments.

We argue the same from the Sicknesses, Pains in the Joints and Back, rheumatic, hysterick, nervous Cafes, Head-ach, Colics, and the like; which many People, especially of the weaker Constitutions, felt, for more than one Day after: Just as after Electrification.

But from hence it is highly worthy of Remark, that the Finger of PROVIDENCE is notoriously discernible herein;

— of HIM,
Who guides the Thunder, and directs the Storm.

Tho' it operates by natural Causes, yet it is *that* which gives them their Destination. For, tho' the Coasts of the Sea are most liable to, and susceptible of this mighty Shock, which we call an Earthquake; yet the chastening Rod is directed to *Towns* and *Cities*, where are Inhabitants, the Objects of its Monition; not to *bare Cliffs*, and an *uninhabited Beach*. And there cannot be a more direct Proof, that Earthquakes are divine Judgments, than *this* Observation: For, in all antient History, Earthquakes are ever found in great Cities. *A. D.* 17, no less than 12 flourishing Cities in *Asia minor* were destroy'd in one Night. In *A. D. 1456.* at *Naples*, 40,000 People perished by an Earthquake. In 1531. in the City of *Lisbon*, 1400 Houses were thrown down.

We

We see and admire the Effects of Electricity, and its stupendous Properties, every Day; which seems as it were an animating Soul to Matter. The Antients had a Notion that the Earth was a great Animal; probably from some Observations of Electricity; but certainly, when in our Days we feel these unusual and extraordinary Convulsions of Nature, it is a Lesson to us, to do our Duty toward that Great Being, who, by a Drop of Water can produce Effects so prodigious.

March 13.
1749-50.

William Stukely.

XXV.

*Extract of a Letter to Mr. J. Ellicott F.R.S.
concerning an Earthquake at Portsmouth,
March 18. 1749-50.*

*Read March 22.
1749.* **B**Y a Letter I had from Mr. *Oakes* at *Portsmouth*, dated the 19th instant, he gives me an Account of the Inhabitants being alarm'd with a severe Shock of an Earthquake on *Sunday* the 18th at Six o' Clock in the Evening; and that it was felt stronger at the *Common*, which is about three Quarters of a Mile distant.